

## Deutsche Akkreditierungsstelle GmbH

**Entrusted according to Section 8 subsection 1 AkkStelleG in connection with Section 1 subsection 1 AkkStelleGBV**

Signatory to the Multilateral Agreements of EA, ILAC and IAF for Mutual Recognition

# Accreditation



The Deutsche Akkreditierungsstelle GmbH attests that the testing laboratory

**CR3-Analytik GmbH & Co. KG**  
**Waterbergstraße 14, 28237 Bremen**

is competent under the terms of DIN EN ISO/IEC 17025:2018 to carry out tests in the following fields:

**physical, physico-chemical, chemical and microbiological analysis of coffee, coffee products, caffeine, tea and other foods of plant origin; selected physical, physico-chemical, chemical and microbiological analysis of water (drinking water, process water, cooling water, industrial water, waste water and surface water); sampling of coffee and coffee products, raw and pure caffeine, cooling water, industrial water, raw water, drinking water, waste water and surface water; sampling and microbiological analysis of industrial water in accordance with section 3 (8) 42nd BImSchV (Federal Emission Control Act)**

The accreditation certificate shall only apply in connection with the notice of accreditation of 09.02.2022 with the accreditation number D-PL-21721-01. It comprises the cover sheet, the reverse side of the cover sheet and the following annex with a total of 17 pages.

Registration number of the certificate: **D-PL-21721-01-00**

Berlin,  
09.02.2022

Dr Heike Manke  
Head of Department

Translation issued:  
02.03.2022

Head of Department



*The certificate together with the annex reflects the status as indicated by the date of issue.*

*The current status of any given scope of accreditation can be found in the directory of accredited bodies maintained by Deutsche Akkreditierungsstelle GmbH at <https://www.dakks.de/en/accredited-bodies-search.html>.*

This document is a translation. The definitive version is the original German accreditation certificate.

See notes overleaf.

# Deutsche Akkreditierungsstelle GmbH

Office Berlin  
Spittelmarkt 10  
10117 Berlin

Office Frankfurt am Main  
Europa-Allee 52  
60327 Frankfurt am Main

Office Braunschweig  
Bundesallee 100  
38116 Braunschweig

The publication of extracts of the accreditation certificate is subject to the prior written approval by Deutsche Akkreditierungsstelle GmbH (DAkKS). Exempted is the unchanged form of separate disseminations of the cover sheet by the conformity assessment body mentioned overleaf.

No impression shall be made that the accreditation also extends to fields beyond the scope of accreditation attested by DAkKS.

The accreditation was granted pursuant to the Act on the Accreditation Body (AkkStelleG) of 31 July 2009 (Federal Law Gazette I p. 2625) and the Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products (Official Journal of the European Union L 218 of 9 July 2008, p. 30). DAkKS is a signatory to the Multilateral Agreements for Mutual Recognition of the European co-operation for Accreditation (EA), International Accreditation Forum (IAF) and International Laboratory Accreditation Cooperation (ILAC). The signatories to these agreements recognise each other's accreditations.

The up-to-date state of membership can be retrieved from the following websites:

EA: [www.european-accreditation.org](http://www.european-accreditation.org)

ILAC: [www.ilac.org](http://www.ilac.org)

IAF: [www.iaf.nu](http://www.iaf.nu)

## Deutsche Akkreditierungsstelle GmbH

### Annex to the Accreditation Certificate D-PL-21721-01-00 according to DIN EN ISO/IEC 17025:2018

**Valid from:** 09.02.2022

**Date of issue:** 09.02.2022

Holder of certificate:

**CR3-Analytik GmbH & Co. KG**  
**Waterbergstraße 14, 28237 Bremen**

Tests in the fields:

**physical, physico-chemical, chemical and microbiological analysis of coffee, coffee products, caffeine, tea and other foods of plant origin;**  
**selected physical, physico-chemical, chemical and microbiological analysis of water (drinking water, process water, cooling water, industrial water, waste water and surface water);**  
**sampling of coffee and coffee products, raw and pure caffeine, cooling water, industrial water, raw water, drinking water, waste water and surface water;**  
**sampling and microbiological analysis of industrial water in accordance with section 3 (8) 42nd BImSchV (Federal Emission Control Act)**

*The management system requirements of DIN EN ISO/IEC 17025 are written in the language relevant to the operations of testing laboratories. Laboratories that conform to the requirements of this standard, operate generally in accordance with the principles of DIN EN ISO 9001.*

*The certificate together with the annex reflects the status as indicated by the date of issue.  
The current status of any given scope of accreditation can be found in the directory of accredited bodies maintained by Deutsche Akkreditierungsstelle GmbH at <https://www.dakks.de/en/content/accredited-bodies-dakks>.*

Abbreviations used: see last page

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**Within the given testing field marked with \*, the testing laboratory is permitted, without being required to inform and obtain prior approval from DAkkS, the free choice of standard or equivalent testing methods.**

**The listed testing methods are exemplary.**

**Within the given testing field marked with \*\*, the testing laboratory is permitted, without being required to inform and obtain prior approval from DAkkS the modification, development and refinement of testing methods.**

**The listed testing methods are exemplary.**

**The testing laboratory is permitted, without being required to inform and obtain prior approval from DAkkS, to use standards or equivalent testing methods listed here with different issue dates.**

**The testing laboratory maintains a current list of all testing methods within the flexible scope of accreditation.**

**1 Examination of coffee, coffee products, caffeine, tea and other foods of plant origin**

**1.1 Sampling and sample preparation**

**1.1.1 Sampling of coffee, coffee products and other foods of plant origin**

ISO 4072 1982-12	Green coffee in bags; Sampling
ISO 6670 2002-08	Instant coffee - Sampling method for bulk units with liners
DIN CEN ISO/TS 17728 2015-11	Microbiology of the food chain - Sampling techniques for microbiological analysis of food and feed samples
DIN EN ISO 6644 2007-05	Flowing cereals and milled cereal products - Automatic sampling by mechanical means (modification: <i>here for coffee and coffee products</i> )
DIN EN ISO 24333 2010-04	Cereals and cereal products - Sampling (modification: <i>here for coffee and coffee products</i> )
ASU L 15.00-4 2011-06	Analysis of foodstuffs; Sampling for cereals and cereal products (modification: <i>here for coffee and coffee products</i> )

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**1.1.2 Sample preparation by digestion of coffee, coffee products, caffeine and other foodstuffs \***

ISO 6668 2008-06	Green coffee - Preparation of samples for use in sensory analysis
DIN EN ISO 6887-4 2017-07	Microbiology of the food chain - Preparation of test samples, initial suspension and decimal dilutions for microbiological examination - Part 4: Specific rules for the preparation of miscellaneous products
DIN EN 13805 2014-12	Foodstuffs - Determination of trace elements - Pressure digestion
DIN 10792 2013-06	Analysis of coffee and coffee products - Preparation of a coffee drink for analytical purposes
FCC Appendix III B 10th Edition, 2016	Digestion of caffeine for heavy metal determination

**1.2 Titrimetric examination of pH value and acid content in roasted coffee, instant coffee and caffeine \***

DIN 10776-1 2016-07	Analysis of coffee and coffee products - Determination of pH and acid content - Part 1: Method for roasted coffee
DIN 10776-2 2016-07	Analysis of coffee and coffee products - Determination of pH and acid content - Part 2: Method for soluble coffee
Ph. Eur. 10.0 0267 2020	Caffeine Monograph; Acid reacting substances, acidity

**1.3 Electrode measurement of pH value and acid content in roasted coffee, instant coffee and caffeine \***

DIN 10776-1 2016-07	Analysis of coffee and coffee products - Determination of pH and acid content - Part 1: Method for roasted coffee (modification: <i>here electrochemical determination</i> )
DIN 10776-2 2016-07	Analysis of coffee and coffee products - Determination of pH and acid content - Part 2: Method for soluble coffee (modification: <i>here electrochemical determination</i> )

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**1.4 Gravimetric examination of parameters and ingredients in coffee, coffee products, caffeine, tea and other foodstuffs of plant origin \*\***

ISO 1446 2001-12	Green coffee - Determination of water content – Basic reference method
ISO 3726 1983-05	Instant coffee. Determination of loss in mass at 70 °C under reduced pressure
ISO 6669 1995-09	Green and roasted coffee - Determination of free-flow bulk density of whole beans (routine method)
ISO 6673 2003-09	Green coffee - Determination of loss in mass at 105 °C
ISO 11294 1994-10	Roasted ground coffee - Determination of moisture content - Method by determination of loss in mass at 103 °C (routine method)
DIN ISO 6673 2007-03	Green coffee - Determination of loss in mass at 105 °C
DIN 10764-2 2014-02	Analysis of coffee and coffee products - Determination of loss in mass of soluble coffee - Part 2: Method using vacuum oven (routine method)
DIN 10764-4 2007-03	Analysis of coffee and coffee products - Determination of loss in mass of soluble coffee - Part 4: Method for soluble coffee and soluble coffee products by heating under atmospheric pressure (routine method)
DIN 10768 1989-10	Analysis of coffee and coffee products - Determination of insoluble matter content of instant coffee
DIN 10775 2016-07	Analysis of coffee and coffee products - Determination of water-soluble extract - Method for roasted coffee
DIN 10775-2 1986-10	Analysis of coffee and coffee products - Determination of water-soluble extract - Part 2: Method for green coffee
DIN 10781 2000-11	Roasted ground coffee - Determination of loss in mass at 103 °C (routine method for the determination of moisture content)
DIN 10800 2016-07	Analysis of tea - Determination of loss in mass of unground tea at 103 °C

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DIN 10802 2016-04	Analysis of tea - Determination of total ash (modification: <i>here also for coffee and coffee products</i> )
Ph. Eur. 10.0 2.4.14 2020	Caffeine Monograph; Loss on drying
Ph. Eur. 10.0 2.4.14 2020	Caffeine Monograph; Sulphated ash
In-house method L 0005 2021-01	Determination of insoluble constituent parts of pure caffeine
In-house method L 0026 2021-01	Determination of dry residue of pure caffeine using thermogravimetry
In-house method L 0033 2021-01	Loss on drying of green and roasted coffee using infrared drying
In-house method L 0096 2021-01	Net quantity of finished packaging

**1.5 Photometric examination of parameters, content and additives in caffeine \***

Ph. Eur. 10.0 2.2.1 2020	Caffeine Monograph; Turbidity
Ph. Eur. 10.0 2.2.2 Methode II 2020	Caffeine Monograph; Colouring (modification: <i>here also colouring of caffeine in phosphoric acid</i> )
NANOCOLOR® Chloride Test 1-20; 07.18 REF 91820 2018-10	Photometric determination with mercury(II) thiocyanate and iron(III) nitrate (Range (mg/L Cl <sup>-</sup> ): 0.2–20.0) (modification: <i>limitation here only caffeine</i> )
Spectroquant® Sulfate-Test Product-no.: 1.01812.0001 2015-03	Photometric determination of sulfate (Measuring range mg/l SO <sub>4</sub> <sup>2-</sup> : 0.50-10.00) (modification: <i>limitation here only caffeine</i> )

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**1.6 Determination of mercury in coffee, coffee products, caffeine and other foods of plant origin using atomic absorption spectrometry (cold-vapour AAS)**

DIN EN 13806  
2002-11                      Foodstuffs - Determination of trace elements - Determination of mercury by cold-vapour atomic absorption spectrometry (CVAAS) after pressure digestion

**1.7 Determination of elements in coffee, coffee products, caffeine and other foods of plant origin using inductively coupled plasma-optical emission spectrometry (ICP-OES) \***

DIN EN ISO 11885 (E 22)  
2009-05                      Water quality - Determination of selected elements by inductively coupled plasma atomic emission spectroscopy (ICP-OES)  
(modification: *here for coffee, coffee products, caffeine and other foodstuffs of plant origin after pressure digestion*)

FCC Appendix III B  
10th Edition, 2016                      Lead in caffeine

In-house method L 0014  
2021-01                      Calculation of detectable heavy metals with a mass reference to the element lead

**1.8 Determination of ingredients and contaminants in coffee, coffee products, caffeine, tea and other foods of plant origin using liquid chromatography (HPLC) with conventional detectors (UV/VIS, DAD and fluorescence detector) \*\***

ISO 20481  
2008-05                      Analysis of coffee and coffee products - Determination of caffeine content using high performance liquid chromatography (HPLC) - Rapid method  
(modification: *here also for tea*)

DIN EN ISO 16050  
2011-09                      Foodstuffs - Determination of aflatoxin B<sub>1</sub> and the total content of aflatoxins B<sub>1</sub>, B<sub>2</sub>, G<sub>1</sub> and G<sub>2</sub> in cereals, nuts and derived products - HPLC method  
(modification: *here for coffee and coffee products*)

DIN EN 14132  
2009-09                      Foodstuffs - Determination of ochratoxin A in barley and roasted coffee - HPLC method with immunoaffinity column clean-up  
(modification: *here also for coffee and coffee products*)

DIN ISO 20481  
2011-01                      Coffee and coffee products - Determination of caffeine content using high performance liquid chromatography (HPLC) - Reference method  
(modification: *here also for tea*)

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DIN 10767 2015-08	Analysis of coffee and coffee products - Determination of chlorogenic acids content in roasted coffee and soluble coffee - HPLC method
DIN 10779 2011-03	Analysis of coffee and coffee products - Determination of the content of 16-O-methylcafestol in roasted coffee; HPLC methods (modification: <i>also for cafestol and kahweol in green coffee, roasted coffee and coffee products</i> )
Ph. Eur. 10.0 2.2.29 2020	Caffeine Monograph; Related substances - Determination of other alkaloids in pure caffeine using HPLC (theobromine, theophylline, paraxanthin, iso-caffeine etc.)
USP Caffeine Monograph 2007	Content determination of pure caffeine (assay).
In-house method L 0090 2021-01	Determination of trigonelline in green and roasted coffee HPLC method
In-house method L 0095 2021-01	Determination of the activity of activated carbon for caffeine adsorption HPLC method

**1.9 Determination of ingredients and additives and of residues and contaminants in coffee, coffee products, tea and other foods of plant origin using liquid chromatography (LC) with mass-selective detectors (MS/MS-detectors) \*\***

DIN EN ISO 18862 2019-12	Analysis of coffee and coffee products - Determination of acrylamide - Methods using HPLC-MS/MS and GC-MS after derivatization
DIN EN 15055 2006-08	Non-fatty foods - Determination of chlormequat and mepiquat - LC-MS/MS method
DIN EN 15662 2018-07	Foods of plant origin - Determination of pesticide residues using GC-MS and/or LC-MS/MS after acetonitrile extraction/partitioning and clean-up by dispersive SPE - QuEChERS-method (modification: limitation here <i>only for green coffee, roasted coffee, coffee extracts and tea</i> )
E DIN EN 16987 2016-06	Foodstuffs - Determination of acrylamide in coffee and coffee products by HPLC-MS/MS and GC-MS
DIN 10785 2013-06	Analysis of coffee and coffee products - Determination of acrylamide - Methods using HPLC-MS/MS and GC-MS after derivatization

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In-house method L 0111 2021-01	Analysis of coffee and coffee products - Determination of the content of 16-O-methylcafestol, kahweol and cafestol in roasted coffee; LC MS/MS method
In-house method L 0134 2021-01	Determination of glyphosate, glufosinate and AMPA using LC/MS-MS
EURL SRM Ver. 11 1.4 (M1.4) 2020-12	PerChlorPhos (modification: <i>limitation here only chlorate</i> )

**1.10 Determination of residues and contaminants in coffee, coffee products, caffeine, tea and other foods of plant origin using gas chromatography (GC) with mass-selective detectors (MS-Detector) \*\***

DIN EN ISO 18862 2019-12	Analysis of coffee and coffee products - Determination of acrylamide - Methods using HPLC-MS/MS and GC-MS after derivatization
DIN EN 12396-2 1998-12	Non-fatty foods - Determination of dithiocarbamate and thiuram disulfide residues - Part 2: Gas chromatographic method
DIN EN 15662 2018-07	Foods of plant origin - Determination of pesticide residues using GC-MS and/or LC-MS/MS after acetonitrile extraction/partitioning and clean-up by dispersive SPE - QuEChERS-method (modification: <i>limitation only for green coffee, roasted coffee and coffee extracts</i> )
DIN EN 16620 2015-06	Food analysis - Determination of furan in coffee and coffee products by headspace gas chromatography and mass spectrometry (HS GC-MS)
E DIN EN 16987 2016-06	Foodstuffs - Determination of acrylamide in coffee and coffee products by HPLC-MS/MS and GC-MS
DIN 10785 2013-06	Analysis of coffee and coffee products - Determination of acrylamide - Methods using HPLC-MS/MS and GC-MS after derivatization
In-house method L 0073 2021-01	Dichloromethane and ethyl acetate in coffee - Determination of dichloromethane and ethyl acetate in roasted coffee samples using automated gas-chromatographic headspace analysis (GC-MS)
In-house method L 0089 2021-01	Determination of phosphine in green and roasted coffee with headspace gas chromatography
In-house method L 0116 2021-01	Determination of furane and methylfurane using headspace gas chromatography and mass spectrometry

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**1.11 Determination of foodstuff ingredients, residues and contaminants in coffee, coffee products and caffeine using gas chromatography (GC) with conventional detectors (ECD- and FID-Detector) \*\***

DIN EN 13191-2 2000-10	Non-fatty foods - Determination of bromide residues - Part 2: Determination of inorganic bromide
DIN 10783 2011-01	Analysis of coffee and coffee products - Determination of dichlormethane in decaffeinated green coffee using headspace gaschromatography
ASU L 00.00-36/2 2004-07	Analysis of foodstuffs - Determination of bromide residues in low-fat foodstuffs - Part 2: Determination of inorganic bromide
USP Chapter 467 2007-07	Determination of the dichloromethane in pure caffeine
In-house method L 0079 2021-01	Determination of ethyl acetate in decaffeinated green coffee using headspace gaschromatography
In-house method L 0087 2021-01	Determination of flavouring agents in coffee oils GC method

**1.12 Simple visual analysis of coffee and caffeine \*\***

ISO 4149 2005-03	Green coffee - Olfactory and visual examination and determination of foreign matter and defects
ISO 6667 1985-11	Green coffee - Determination of proportion of insect-damaged beans
In-house method L 0106 2021-01	Staining of a 20% caffeine solution

**1.13 Optical microscopy of coffee, coffee products and caffeine**

In-house method L 0139 2021-01	Foreign components in roasted coffee and coffee products
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**1.14 Simple descriptive test of coffee, coffee products and caffeine**

DIN 10964                                      Sensory analysis - Simple descriptive test  
2014-11

**1.15 Special sensory analysis of coffee, coffee products and caffeine \*\***

DIN 10975                                      Sensory analysis - Expert witness for the judgement of conformity with  
2005-04                                      food law  
(modification: *limitation here for coffee, coffee products, caffeine and  
other foodstuffs*)

In-house method L 0011                      Determination of appearance, odour and taste of caffeine  
2021-01

In-house method L 0138                      Special sensory tests of coffee and coffee products  
2021-01

**1.16 Sieve analysis of coffee and caffeine**

ISO 4150    Green coffee - Size analysis - Manual and machine sieving  
2011-11

In-house method L 0085                      Sieving of pure caffeine  
2021-01

**1.17 Other physical, physico-chemical, chemical tests of coffee, coffee products, caffeine and other foodstuffs**

DIN EN 15948                                      Cereals - Determination of moisture and protein - Method using near-  
2020-12                                      infrared-spectroscopy in whole kernels  
(modification: *limitation here for moisture of coffee and coffee  
products*)

Ph. Eur. 10.0                                      Caffeine Monograph; Test for identity; Test for purity  
7.0/0267  
2020

Ph. Eur. 10.0                                      Caffeine Monograph; Melting point  
2.2.14  
2020

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JP General Test No. 49  
XIV Edition

Determination of readily carbonized substances in caffeine

In-house method L 0012  
2021-01

Determination of chloroform solubility of caffeine

**1.18 Detection of bacteria, yeasts and moulds in coffee, coffee products, caffeine, tea and oats with cultural microbiological analysis \***

ISO 4832  
2006-02

Microbiology of food and animal feeding stuffs - Horizontal method for the enumeration of coliforms - Colony-count technique

DIN ISO 16649-2  
2009-12

Microbiology of food and animal feeding stuffs - Horizontal method for the enumeration of  $\beta$ -glucuronidase-positive Escherichia coli - Part 2: Colony-count technique at 44 °C using 5-bromo-4-chloro-3-indolyl  $\beta$ -D-glucuronide

DIN EN ISO 4833-1  
2013-12

Microbiology of the food chain - Horizontal method for the enumeration of microorganisms - Part 1: Colony-count at 30 °C by the pour plate technique

DIN EN ISO 4833-2  
2014-05

Microbiology of the food chain - Horizontal method for the enumeration of microorganisms - Part 2: Colony count at 30 °C by the surface plating technique

DIN EN ISO 21528-2  
2019-05

Microbiology of the food chain - Horizontal method for the detection and enumeration of Enterobacteriaceae - Part 2: Colony-count technique

DIN 10186  
2005-10

Microbiological analysis of milk - Enumeration of yeasts and moulds - Reference method  
(modification: *here for coffee, coffee products and other foodstuffs*)

ASU L 01.00-37  
1991-12

Analysis of foodstuffs - Enumeration of yeasts and moulds in milk and dairy products - Reference method  
(modification: *here for coffee, coffee products and other foodstuffs; surface plating technique*)

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**2 Analysis of water (drinking water, process water, cooling water, industrial water, waste water und surface water)**

**2.1 Sampling**

DIN 38402-A 11 2009-02	Sampling of waste water
DIN 38402-A 12 1985-06	Sampling from still waters (modification: <i>limitation here only sampling of near-shore scoop samples</i> )
DIN ISO 5667-5 (A 14) 2011-02	Water quality; Guidance on sampling of drinking water from treatment works and piped distribution systems
DIN EN ISO 5667-3 (A 21) 2019-07	Water quality; Sampling; Preservation and handling of water samples
DIN 38402 A-22 1991-06	Sampling of industrial cooling water
DIN EN ISO 19458 (K 19) 2006-12	Water quality; Sampling for microbiological analysis (modification: <i>limitation here no sampling of drinking water</i> )
VDI 2047, Blatt 2 2019-01	Open recoler systems - Securing hygienically sound operation of evaporative cooling systems (VDI Cooling Tower Code of Practice) (modification: <i>limitation here execution of sampling</i> )
UBA-recommendation 2020-03	Recommendation of the Federal Environmental Agency for the sampling and detection of Legionella in evaporative cooling plants, cooling towers and wet separators dated 06.03.2020, Sections C and D

**2.2 Physical and physico-chemical parameters**

DIN 38404-C 4 1976-12	Determination of temperature
DIN EN ISO 10523 (C 5) 2012-04	Determination of pH
DIN EN 27888 (C 8) 1993-11	Water quality; Determination of electrical conductivity
DIN EN ISO 7027 (C 2) 2016-11	Water quality; Determination of turbidity; Quantitative method

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DIN EN ISO 9963-1 (C 23) 1996-02	Water quality; Determination of alkalinity, determination of total and composite alkalinity
DIN EN ISO 9963-2 (C 24) 1996-02	Water quality; Determination of alkalinity, determination of carbonate alkalinity
DEV D 8 1971	Calculation of dissolved carbon dioxide (of free carbonic acid), carbonate and hydrogen carbonate ion
In-house method L 0024 2021-01	Determination of the density of liquids by the bending vibration measurement method

**2.3 Element determination/cations**

DIN 38406-E 3 2002-03	Determination of calcium and magnesium, complexometric method
DIN EN ISO 12846 (E 12) 2012-08	Water quality - Determination of mercury by atomic absorption spectrometry (AAS) with and without enrichment
DIN EN ISO 11885 (E 22) 2009-09	Water quality - Determination of selected elements by inductively coupled plasma atomic emission spectroscopy (ICP-OES)
In-house method L 0047 2021-01	Determination of the iron binding capacity of boiler protection solution using gravimetry

**2.4 Organic parameters and sum parameters**

DIN EN ISO 10301 (F 4) 1997-08	Water quality - Determination of highly volatile halogenated hydrocarbons - Gas-chromatographic methods
DIN EN ISO 5814 (G 22) 2013-02	Water quality; Determination of dissolved oxygen - electrochemical probe method
DIN 38409-H 1 1987-01	Determination of total dry residue, filtrate dry residue and residue on ignition
DIN 38409-H 2 1987-03	Determination of filterable matter and the residue on ignition
DIN 38409-H 6 1986-01	Water hardness

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DIN 38409-H 7 2005-12	Determination of acid and base capacity
DIN ISO 15705 (H 45) 2003-01	Water quality - Determination of the chemical oxygen demand index (ST-COD) - small-scale sealed tube method
DIN 38409-H 56 2009-06	Gravimetric determination of low volatile lipophilic substances after solvent extraction
In-house method L 0001 2021-01	Continuous dichloromethane online monitoring in cooling waters using a strip process with subsequent UV mineralization and conductivity detection
In-house method L 0049 2021-01	Determination of the oxidizability of waters with potassium permanganate using tetrimetry

**2.5 Determination of bacteria by cultural microbiological analysis in cooling water, industrial water, drinking water, surface water and process water \***

DIN EN ISO 6222 (K 5) 1999-07	Water quality - Enumeration of culturable micro-organisms - Colony count by inoculation in a nutrient agar culture medium (Colony count at 22 °C und 36 °C)
DIN EN ISO 16266 (K 11) 2008-05	Water quality - Detection and enumeration of Pseudomonas aeruginosa - Method by membrane filtration
DIN EN ISO 11731 2019-03	Water quality - Enumeration of Legionella
UBA-recommendation 2020-03	Recommendation of the Federal Environmental Agency for the sampling and detection of Legionella in evaporative cooling plants, cooling towers and wet separators dated 06.03.2020, Sections E and F taking into account Annexes 1 and 2

**2.6 Determination of anions and cations using photometry (Quick tests with finished reagents) in drinking water, cooling water, waste water, surface water and process water \***

MColortest ® Chlordioxid-Küvettest Produktnr.: 1.18754.0001 2015-02	Colorimetric determination of chlorine dioxide (Range: 0,020-0,55 mg/l ClO <sub>2</sub> )
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<p>NANOCOLOR® Ammonium 3 test 0-03; 12.16 REF 985 003 2020-08</p>	<p>Photometric determination of Ammonium as indophenol (Range: 0,05-3,00 mg/L NH<sub>4</sub><sup>+</sup>/NH<sub>3</sub>)</p>
<p>NANOCOLOR® Iron 3 Test 0-37; 06.17 REF 985 037 2020-08</p>	<p>Photometric determination with diphenylpyridyl triazine (Range: 0,10-3,00 mg/L Fe)</p>
<p>NANOCOLOR® Manganese 10 test 0-58; 03.16 REF 985 058 2017-11</p>	<p>Photometric determination of total manganese with formaldoxime (Range: 0,1-10,0 mg/L Mn)</p>
<p>NANOCOLOR® Nitrate 50 test 0-64; 10.18 REF 985 064 2020-10</p>	<p>Photometric determination of nitrate with 2,6-dimethylphenol in sulfuric acid - phosphoric acid - mixture (Range: 2-100 mg/L NO<sub>3</sub><sup>-</sup>)</p>
<p>NANOCOLOR® ortho- and total Phosphate 1 test 0-76; 12.17 REF 985 076 2020-06</p>	<p>Photometric determination of phosphate as molybdenum blue after acid hydrolysis and oxidation at 100 - 200 °C (Range: 0.05-1.50 mg/L P (PO<sub>4</sub>-P))</p>
<p>NANOCOLOR® Chloride test 1-20 REF 91820 2020-01</p>	<p>Photometric determination with mercury(II) thiocyanate and iron(III) nitrate (Range (mg/L Cl<sup>-</sup>): 0.2-20.0)</p>
<p>NANOCOLOR® Silica (silicic acid) test 1-48; 08.17 REF 91848 2019-09</p>	<p>Photometric determination as silico-molybdenum blue (Range (mg/L Si): 0,005-10)</p>
<p>Spectroquant® Sulfate Test Product no.: 1.01812.0001 2020-02</p>	<p>Photometric determination of sulfate (Measuring range: 0,50-50,0 mg/l SO<sub>4</sub><sup>2-</sup>)</p>

Valid from: 09.02.2022  
Date of issue: 09.02.2022

**Annex to the accreditation certificate D-PL-21721-01-00**

Spectroquant®    Photometric determination of sulfate  
Sulfate cell test    (Measuring range: 5 - 250 mg/l SO<sub>4</sub><sup>2-</sup>)  
Product no.: 1.14548.0001  
2020-02

**3                      Sampling and microbiological analysis of industrial water in accordance with Section 3 (8) 42<sup>nd</sup> BImSchV (Federal Emission Control Act)**

**Sampling**

Method	Title
DIN EN ISO 19458 (K 19) 2006-12	Water quality - Sampling for microbiological analysis <hr/> Recommendation of the Federal Environmental Agency for the sampling and detection of Legionella in evaporative cooling plants, cooling towers and wet separators dated 06.03.2020, Sections C and D

**Microbiological analyses**

Parameter	Method
Legionella	DIN EN ISO 11731 (K 23) 2019-03 <hr/> Recommendation of the Federal Environmental Agency for the sampling and detection of Legionella in evaporative cooling plants, cooling towers and wet separators dated 06.03.2020, Sections E and F taking into account Annexes 1 and 2
Colony count at 22°C and 36 °C	DIN EN ISO 6222 (K 5) 1999-07

**Annex to the accreditation certificate D-PL-21721-01-00**

**Abbreviations used:**

ASU	official collection of investigations according to § 64 LFGB
BImSchV	German Ordinance for the implementation of the Federal Immission Control Act
DIN	German Institute for Standardisation
EN	European Standard
FCC	Food Chemical Codex
In-house method L	In-house method of CR3-Analytik GmbH & Co. KG
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
JP	Japanese Pharmacopeia
LFGB	German Food and Feed Code
Ph. Eur.	Pharmacopoea Europaea
UBA	German Federal Environment Agency
USP	United States Pharmacopeia
VDI	Association of German Engineers

## List of testing methods within the flexible scope of accreditation

List of currently applied accredited testing methods. Changes that deviate from the latest annex to the accreditation certificate from 09.02.2022 are marked (■).

### 1 Examination of coffee, coffee products, caffeine, tea and other foods of plant origin

#### 1.1 Sampling and sample preparation

##### 1.1.1 Sampling of coffee, coffee products and other foods of plant origin

ISO 4072 1982-12	Green coffee in bags; Sampling
ISO 6670 2002-08	Instant coffee - Sampling method for bulk units with liners
DIN CEN ISO/TS 17728 2015-11	Microbiology of the food chain - Sampling techniques for microbiological analysis of food and feed samples
DIN EN ISO 6644 2007-05	Flowing cereals and milled cereal products - Automatic sampling by mechanical means (modification: <i>here for coffee and coffee products</i> )
DIN EN ISO 24333 2010-04	Cereals and cereal products - Sampling (modification: <i>here for coffee and coffee products</i> )
ASU L 15.00-4 2011-06	Analysis of foodstuffs; Sampling for cereals and cereal products (modification: <i>here for coffee and coffee products</i> )

##### 1.1.2 Sample preparation by digestion of coffee, coffee products, caffeine and other foodstuffs \*

ISO 6668 2008-06	Green coffee - Preparation of samples for use in sensory analysis
DIN EN ISO 6887-4 2017-07	Microbiology of the food chain - Preparation of test samples, initial suspension and decimal dilutions for microbiological examination - Part 4: Specific rules for the preparation of miscellaneous products
DIN EN 13805 2014-12	Foodstuffs - Determination of trace elements - Pressure digestion

DIN 10792  
2013-06 Analysis of coffee and coffee products - Preparation of a coffee drink for analytical purposes

FCC Appendix III B  
10th Edition, 2016 Digestion of caffeine for heavy metal determination

**1.2 Titrimetric examination of pH value and acid content in roasted coffee, instant coffee and caffeine \***

DIN 10776-1  
2016-07 Analysis of coffee and coffee products - Determination of pH and acid content - Part 1: Method for roasted coffee

DIN 10776-2  
2016-07 Analysis of coffee and coffee products - Determination of pH and acid content - Part 2: Method for soluble coffee

Ph. Eur. 10.0  
0267  
2020 Caffeine Monograph;  
Acid reacting substances, acidity

**1.3 Electrode measurement of pH value and acid content in roasted coffee, instant coffee and caffeine \***

DIN 10776-1  
2016-07 Analysis of coffee and coffee products - Determination of pH and acid content - Part 1: Method for roasted coffee  
(modification: *here electrochemical determination*)

DIN 10776-2  
2016-07 Analysis of coffee and coffee products - Determination of pH and acid content - Part 2: Method for soluble coffee  
(modification: *here electrochemical determination*)

**1.4 Gravimetric examination of parameters and ingredients in coffee, coffee products, caffeine, tea and other foodstuffs of plant origin \*\***

ISO 1446  
2001-12 Green coffee - Determination of water content – Basic reference method

ISO 3726  
1983-05 Instant coffee. Determination of loss in mass at 70 °C under reduced pressure

ISO 6669  
1995-09 Green and roasted coffee - Determination of free-flow bulk density of whole beans (routine method)

ISO 6673 2003-09	Green coffee - Determination of loss in mass at 105 °C
ISO 9768 1994-08	Tea - Determination of water extract
ISO 11294 1994-10	Roasted ground coffee - Determination of moisture content - Method by determination of loss in mass at 103 °C (routine method)
DIN ISO 1576 1992-05	Tea - Determination of water-soluble ash and water-insoluble ash
DIN ISO 6673 2007-03	Green coffee - Determination of loss in mass at 105 °C
DIN 10764-2 2014-02	Analysis of coffee and coffee products - Determination of loss in mass of soluble coffee - Part 2: Method using vacuum oven (routine method)
DIN 10764-3 2016-07	Testing of coffee and coffee products - Determination of dry matter content of soluble coffee – Part 3: Sea sand method for liquid coffee extracts
DIN 10764-4 2007-03	Analysis of coffee and coffee products - Determination of loss in mass of soluble coffee - Part 4: Method for soluble coffee and soluble coffee products by heating under atmospheric pressure (routine method)
DIN 10768 1989-10	Analysis of coffee and coffee products - Determination of insoluble matter content of instant coffee
DIN 10775 2016-07	Analysis of coffee and coffee products - Determination of water-soluble extract - Method for roasted coffee
DIN 10775-2 1985-11	Analysis of coffee and coffee products - Determination of water-soluble extract - Part 2: Method for green coffee
DIN 10781 2000-11	Roasted ground coffee - Determination of loss in mass at 103 °C (routine method for the determination of moisture content)
DIN 10800 2016-07	Analysis of tea - Determination of loss in mass of unground tea at 103 °C

DIN 10802 2016-04	Analysis of tea - Determination of total ash (modification: <i>here also for coffee and coffee products</i> )
DIN 10805 1985-10	Analysis of tea - Determination of acid insoluble ash
DIN 10806 2016-07	Analysis of tea - Preparation of ground sample of defined dry matter content
Ph. Eur. 10.0 2.4.14 2020	Caffeine Monograph; Loss on drying
Ph. Eur. 10.0 2.4.14 2020	Caffeine Monograph; Sulphated ash
In-house method L 0005 2022-06	Determination of insoluble constituent parts of pure caffeine
In-house method L 0026 2021-01	Determination of dry residue of pure caffeine using thermogravimetry
In-house method L 0033 2022-05	Loss on drying of green and roasted coffee using infrared drying
In-house method L 0096 2021-01	Net quantity of finished packaging

**1.5 Photometric examination of parameters, content and additives in caffeine \***

Ph. Eur. 10.0 2.2.1 2020	Caffeine Monograph; Turbidity
Ph. Eur. 10.0 2.2.2 Methode II 2020	Caffeine Monograph; Colouring (modification: <i>here also colouring of caffeine in phosphoric acid</i> )

NANOCOLOR® Chloride      Photometric determination with mercury(II) thiocyanate and  
Test 1-20; 07.18      iron(III) nitrate  
REF 91820      (Range (mg/L Cl<sup>-</sup>): 0.2–20.0)  
**2021-07**      (modification: *matrix here only caffeine*)

Spectroquant®      Photometric determination of sulfate  
Sulfate-Test      (Measuring range mg/l SO<sub>4</sub><sup>2-</sup>: 0.50-10.00)  
Product-no.: 1.01812.0001      (modification: *matrix here only caffeine*)  
**2020-02**

### **1.6 Determination of mercury in coffee, coffee products, caffeine and other foods of plant origin using atomic absorption spectrometry (cold-vapour AAS)**

DIN EN 13806      Foodstuffs - Determination of trace elements - Determination of  
2002-11      mercury by cold-vapour atomic absorption spectrometry (CVAAS)  
after pressure digestion

### **1.7 Determination of elements in coffee, coffee products, caffeine and other foods of plant origin using inductively coupled plasma-optical emission spectrometry (ICP-OES) \***

DIN EN ISO 11885 (E 22)      Water quality - Determination of selected elements by inductively  
2009-05      coupled plasma atomic emission spectroscopy (ICP-OES)  
(modification: *here for coffee, coffee products, caffeine and other  
foodstuffs of plant origin after pressure digestion*)

FCC Appendix III B      Lead in caffeine  
10th Edition, 2016

In-house method L 0014      Calculation of detectable heavy metals with a mass reference to  
2021-01      the element lead

### **1.8 Determination of ingredients and contaminants in coffee, coffee products, caffeine, tea and other foods of plant origin using liquid chromatography (HPLC) with conventional detectors (UV/VIS, DAD and fluorescence detector) \*\***

ISO 20481      Analysis of coffee and coffee products - Determination of caffeine  
2008-05      content using high performance liquid chromatography (HPLC) -  
Rapid method  
(modification: *here also for tea*)



DIN EN ISO 16050 2011-09	Foodstuffs - Determination of aflatoxin B <sub>1</sub> and the total content of aflatoxins B <sub>1</sub> , B <sub>2</sub> , G <sub>1</sub> and G <sub>2</sub> in cereals, nuts and derived products - HPLC method (modification: <i>here for coffee and coffee products</i> )
DIN EN 14132 2009-09	Foodstuffs - Determination of ochratoxin A in barley and roasted coffee - HPLC method with immunoaffinity column clean-up (modification: <i>here also for coffee and coffee products</i> )
DIN ISO 20481 2011-01	Coffee and coffee products - Determination of caffeine content using high performance liquid chromatography (HPLC) - Reference method (modification: <i>here also for tea</i> )
DIN 10767 2015-08	Analysis of coffee and coffee products - Determination of chlorogenic acids content in roasted coffee and soluble coffee - HPLC method
DIN 10779 2011-03	Analysis of coffee and coffee products - Determination of the content of 16-O-methylcafestol in roasted coffee; HPLC methods (modification: <i>also for cafestol and kahweol in green coffee, roasted coffee and coffee products</i> )
Ph. Eur. 10.0 2.2.29 2020	Caffeine Monograph; Related substances - Determination of other alkaloids in pure caffeine using HPLC (theobromine, theophylline, paraxanthin, iso-caffeine etc.)
USP Caffeine Monograph 2007	Content determination of pure caffeine (assay).
In-house method L 0090 2021-01	Determination of trigonelline in green and roasted coffee HPLC method
In-house method L 0095 2021-01	Determination of the activity of activated carbon for caffeine adsorption HPLC method

**1.9 Determination of ingredients and additives and of residues and contaminants in coffee, coffee products, tea and other foods of plant origin using liquid chromatography (LC) with mass-selective detectors (MS/MS-detectors) \*\***

DIN EN ISO 18862 2019-12	Analysis of coffee and coffee products - Determination of acrylamide - Methods using HPLC-MS/MS and GC-MS after derivatization
DIN EN 15055 2006-08	Non-fatty foods - Determination of chlormequat and mepiquat - LC-MS/MS method
DIN EN 15662 2018-07	Foods of plant origin - Determination of pesticide residues using GC-MS and/or LC-MS/MS after acetonitrile extraction/partitioning and clean-up by dispersive SPE - QuEChERS-method <i>(modification: only for green coffee, roasted coffee, coffee extracts and tea)</i>
E DIN EN 16987 2016-06	Foodstuffs - Determination of acrylamide in coffee and coffee products by HPLC-MS/MS and GC-MS
DIN 10785 2013-06	Analysis of coffee and coffee products - Determination of acrylamide - Methods using HPLC-MS/MS and GC-MS after derivatization
In-house method L 0111 2021-01	Analysis of coffee and coffee products - Determination of the content of 16-O-methylcafestol, kahweol and cafestol in roasted coffee; LC MS/MS method
In-house method L 0134 2022-04	Determination of glyphosate, glufosinate and AMPA using LC/MS-MS
In-house method L 0146 2022-06	Determination of asparagine using LC/MS-MS
EURL SRM Ver. 12 1.4 (M1.4) 2021-07	PerChlorPhos <i>(modification: limitation here only chlorate and perchlorate)</i>

**1.10 Determination of residues and contaminants in coffee, coffee products, caffeine, tea and other foods of plant origin using gas chromatography (GC) with mass-selective detectors (MS-Detector) \*\***

DIN EN ISO 18862 2019-12	Analysis of coffee and coffee products - Determination of acrylamide - Methods using HPLC-MS/MS and GC-MS after derivatization
DIN EN 12396-2 1998-12	Non-fatty foods - Determination of dithiocarbamate and thiuram disulfide residues - Part 2: Gas chromatographic method
DIN EN 15662 2018-07	Foods of plant origin - Determination of pesticide residues using GC-MS and/or LC-MS/MS after acetonitrile extraction/partitioning and clean-up by dispersive SPE - QuEChERS-method (modification: <i>only for green coffee, roasted coffee and coffee extracts</i> )
DIN EN 16620 2015-06	Food analysis - Determination of furan in coffee and coffee products by headspace gas chromatography and mass spectrometry (HS GC-MS)
E DIN EN 16987 2016-06	Foodstuffs - Determination of acrylamide in coffee and coffee products by HPLC-MS/MS and GC-MS
DIN 10785 2013-06	Analysis of coffee and coffee products - Determination of acrylamide - Methods using HPLC-MS/MS and GC-MS after derivatization
In-house method L 0073 2022-06	Dichloromethane and ethyl acetate in coffee - Determination of dichloromethane and ethyl acetate in roasted coffee samples using automated gas-chromatographic headspace analysis (GC-MS)
In-house method L 0089 2021-01	Determination of phosphine in green and roasted coffee with headspace gas chromatography
In-house method L 0116 2022-03	Determination of furane and methylfurane and 2-butanone using headspace gas chromatography and mass spectrometry

**1.11 Determination of foodstuff ingredients, residues and contaminants in coffee, coffee products and caffeine using gas chromatography (GC) with conventional detectors (ECD- and FID-Detector) \*\***

DIN EN 13191-2 2000-10	Non-fatty foods - Determination of bromide residues - Part 2: Determination of inorganic bromide
DIN EN 16995 2017-08	Foodstuffs - Vegetable oils and foodstuff on basis of vegetable oils - Determination of mineral oil saturated hydrocarbons (MOSH) and mineral oil aromatic hydrocarbons (MOAH) with on-line HPLC-GC-FID analysis (modification: <i>only for green coffee and roasted coffee</i> )
DIN 10783 2011-01	Analysis of coffee and coffee products - Determination of dichlormethane in decaffeinated green coffee using headspace gaschromatography
ASU L 00.00-36/2 2004-07	Analysis of foodstuffs - Determination of bromide residues in low-fat foodstuffs - Part 2: Determination of inorganic bromide
USP Chapter 467 2007-07	Determination of the dichloromethane in pure caffeine
In-house method L 0079 2022-06	Determination of ethyl acetate in decaffeinated green coffee using headspace gaschromatography
In-house method L 0087 2022-06	Determination of flavouring agents in coffee oils GC method

**1.12 Simple visual analysis of coffee and caffeine \*\***

ISO 4149 2005-03	Green coffee - Olfactory and visual examination and determination of foreign matter and defects
ISO 6667 1985-11	Green coffee - Determination of proportion of insect-damaged beans
In-house method L 0106 2021-01	Staining of a 20% caffeine solution

**1.13 Optical microscopy of coffee, coffee products and caffeine**

In-house method L 0139 Foreign components in roasted coffee and coffee products  
2021-01

#### **1.14 Simple descriptive test of coffee, coffee products and caffeine**

DIN 10964 Sensory analysis - Simple descriptive test  
2014-11

#### **1.15 Special sensory analysis of coffee, coffee products and caffeine \*\***

DIN 10975 Sensory analysis - Expert witness for the judgement of  
2005-04 conformity with food law  
(modification: *limitation here for coffee, coffee products, caffeine and other foodstuffs*)

In-house method L 0011 Determination of appearance, odour and taste of caffeine  
2021-01

In-house method L 0138 Special sensory tests of coffee and coffee products  
2021-01

#### **1.16 Sieve analysis of coffee and caffeine**

ISO 4150 Green coffee - Size analysis - Manual and machine sieving  
2011-11

In-house method L 0085 Sieving of pure caffeine  
2021-01

#### **1.17 Other physical, physico-chemical, chemical tests of coffee, coffee products, caffeine and other foodstuffs**

DIN EN 15948 Cereals - Determination of moisture and protein - Method using  
2020-12 near-infrared-spectroscopy in whole kernels  
(modification: *limitation here for moisture of coffee and coffee products*)

Ph. Eur. 10.0  
7.0/0267  
2020

Caffeine Monograph; Test for identity; Test for purity

Ph. Eur. 10.0  
2.2.14  
2020

Caffeine Monograph; Melting point

JP General Test No. 1.15  
XVIII Edition  
2021-06

Determination of readily carbonized substances in caffeine

In-house method L 0012  
2021-01

Determination of chloroform solubility of caffeine

## 1.18 Detection of bacteria, yeasts and moulds in coffee, coffee products, caffeine, tea and oats with cultural microbiological analysis \*

ISO 4832  
2006-02

Microbiology of food and animal feeding stuffs - Horizontal method for the enumeration of coliforms - Colony-count technique

ISO 21527-2  
2008-07

Microbiology of food and animal feeding stuffs - Horizontal method for the enumeration of yeasts and moulds – Part 2: Colony count technique in products with water activity less than or equal to 0,95

DIN ISO 16649-2  
2020-12

Microbiology of food and animal feeding stuffs - Horizontal method for the enumeration of  $\beta$ -glucuronidase-positive Escherichia coli - Part 2: Colony-count technique at 44 °C using 5-bromo-4-chloro-3-indolyl  $\beta$ -D-glucuronide

DIN EN ISO 4833-1  
2022-05

Microbiology of the food chain - Horizontal method for the enumeration of microorganisms - Part 1: Colony-count at 30 °C by the pour plate technique

DIN EN ISO 4833-2  
2022-05

Microbiology of the food chain - Horizontal method for the enumeration of microorganisms - Part 2: Colony count at 30 °C by the surface plating technique

DIN EN ISO 21528-2  
2019-05

Microbiology of the food chain - Horizontal method for the detection and enumeration of Enterobacteriaceae - Part 2: Colony-count technique

DIN 10186  
2005-10

Microbiological analysis of milk - Enumeration of yeasts and moulds - Reference method  
(modification: *here for coffee, coffee products and other foodstuffs*)

ASU L 01.00-37  
1991-12

Analysis of foodstuffs - Enumeration of yeasts and moulds in milk and dairy products - Reference method  
(modification: *here for coffee, coffee products and other foodstuffs; surface plating technique*)

**2 Analysis of water (drinking water, process water, cooling water, industrial water, waste water und surface water)**

**2.1 Sampling**

DIN 38402-A 11 2009-02	Sampling of waste water
DIN 38402-A 12 1985-06	Sampling from still waters (modification: <i>limitation only sampling of near-shore scoop samples</i> )
DIN ISO 5667-5 (A 14) 2011-02	Water quality; Guidance on sampling of drinking water from treatment works and piped distribution systems
DIN EN ISO 5667-3 (A 21) 2019-07	Water quality; Sampling; Preservation and handling of water samples
DIN 38402 A-22 1991-06	Sampling of industrial cooling water
DIN EN ISO 19458 (K 19) 2006-12	Water quality; Sampling for microbiological analysis (modification: <i>limitation no sampling of drinking water</i> )
VDI 2047, Blatt 2 2019-01	Open recoler systems - Securing hygienically sound operation of evaporative cooling systems (VDI Cooling Tower Code of Practice) (modification: <i>limitation here execution of sampling</i> )
UBA-recommendation 2020-03	Recommendation of the Federal Environmental Agency for the sampling and detection of Legionella in evaporative cooling plants, cooling towers and wet separators dated 06.03.2020, Sections C and D

**2.2 Physical and physico-chemical parameters**

DIN 38404-C 4 1976-12	Determination of temperature
DIN EN ISO 10523 (C 5) 2012-04	Determination of pH
DIN EN 27888 (C 8) 1993-11	Water quality; Determination of electrical conductivity



DIN EN ISO 7027 (C 2) 2016-11	Water quality; Determination of turbidity; Quantitative method
DIN EN ISO 9963-1 (C 23) 1996-02	Water quality; Determination of alkalinity, determination of total and composite alkalinity
DIN EN ISO 9963-2 (C 24) 1996-02	Water quality; Determination of alkalinity, determination of carbonate alkalinity
DEV D 8 1971	Calculation of dissolved carbon dioxide (of free carbonic acid), carbonate and hydrogen carbonate ion
In-house method L 0024 2021-01	Determination of the density of liquids by the bending vibration measurement method

## 2.3 Element determination/cations

DIN 38406-E 3 2002-03	Determination of calcium and magnesium, complexometric method
DIN EN ISO 12846 (E 12) 2012-08	Water quality - Determination of mercury by atomic absorption spectrometry (AAS) with and without enrichment
DIN EN ISO 11885 (E 22) 2009-09	Water quality - Determination of selected elements by inductively coupled plasma atomic emission spectroscopy (ICP-OES)
In-house method L 0047 2021-01	Determination of the iron binding capacity of boiler protection solution using gravimetry

## 2.4 Organic parameters and sum parameters

DIN EN ISO 10301 (F 4) 1997-08	Water quality - Determination of highly volatile halogenated hydrocarbons - Gas-chromatographic methods
DIN EN ISO 5814 (G 22) 2013-02	Water quality; Determination of dissolved oxygen - electrochemical probe method
DIN 38409-H 1 1987-01	Determination of total dry residue, filtrate dry residue and residue on ignition
DIN 38409-H 2 1987-03	Determination of filterable matter and the residue on ignition

DIN 38409-H 6 1986-01	Water hardness
DIN 38409-H 7 2005-12	Determination of acid and base capacity
DIN ISO 15705 (H 45) 2003-01	Water quality - Determination of the chemical oxygen demand index (ST-COD) - small-scale sealed tube method
DIN 38409-H 56 2009-06	Gravimetric determination of low volatile lipophilic substances after solvent extraction
In-house method L 0001 2021-01	Continuous dichloromethane online monitoring in cooling waters using a strip process with subsequent UV mineralization and conductivity detection
In-house method L 0049 2021-01	Determination of the oxidizability of waters with potassium permanganate using tetrimetry

**2.5 Determination of bacteria by cultural microbiological analysis in cooling water, industrial water, drinking water, surface water and process water \***

DIN EN ISO 6222 (K 5) 1999-07	Water quality - Enumeration of culturable micro-organisms - Colony count by inoculation in a nutrient agar culture medium (Colony count at 22 °C und 36 °C)
DIN EN ISO 16266 (K 11) 2008-05	Water quality - Detection and enumeration of Pseudomonas aeruginosa - Method by membrane filtration
DIN EN ISO 11731 2019-03	Water quality - Enumeration of Legionella
UBA-recommendation 2020-03	Recommendation of the Federal Environmental Agency for the sampling and detection of Legionella in evaporative cooling plants, cooling towers and wet separators dated 06.03.2020, Sections E and F taking into account Annexes 1 and 2

**2.6 Determination of anions and cations using photometry (Quick tests with finished reagents) in drinking water, cooling water, waste water, surface water and process water \***

MColortest® Chlordioxid-Küvettest Produktnr.: 1.18754.0001 2015-02	Colorimetric determination of chlorine dioxide (Range: 0,020-0,55 mg/l ClO <sup>2</sup> )
NANOCOLOR® Ammonium 3 test 0-03; 12.16 REF 985 003 2023-07	Photometric determination of Ammonium as indophenol (Range: 0,05-3,00 mg/L NH <sub>4</sub> <sup>+</sup> /NH <sub>3</sub> )
NANOCOLOR® Iron 3 Test 0-37; 06.17 REF 985 037 2023-10	Photometric determination with diphenylpyridyl triazine (Range: 0,10-3,00 mg/L Fe)
NANOCOLOR® Manganese 10 test 0-58; 03.16 REF 985 058 2023-03	Photometric determination of total manganese with formaldoxime (Range: 0,1-10,0 mg/L Mn)
NANOCOLOR® Nitrate 50 test 0-64; 10.18 REF 985 064 2023-07	Photometric determination of nitrate with 2,6-dimethylphenol in sulfuric acid - phosphoric acid - mixture (Range: 2-100 mg/L NO <sub>3</sub> <sup>-</sup> )
NANOCOLOR® ortho- and total Phosphate 1 test 0-76; 12.17 REF 985 076 2023-05	Photometric determination of phosphate as molybdenum blue after acid hydrolysis and oxidation at 100 - 200 °C (Range: 0.05-1.50 mg/L P (PO <sub>4</sub> -P))
NANOCOLOR® Chloride test 1-20 REF 91820 2022-03	Photometric determination with mercury(II) thiocyanate and iron(III) nitrate (Range (mg/L Cl <sup>-</sup> ): 0.2-20.0)
NANOCOLOR® Silicic acid test 1-48; 08.17 REF 91848 2021-11	Photometric determination as silico-molybdenum blue (Range (mg/L Si): 0,005-10)

Spectroquant®  
Sulfate Test  
Product no.: 1.01812.0001  
2020-02

Photometric determination of sulfate  
(Measuring range: 0,50-50,0 mg/l SO<sub>4</sub><sup>2-</sup>)

Spectroquant®  
Sulfate cell test  
Product no.: 1.14548.0001  
2023-02

Photometric determination of sulfate  
(Measuring range: 5 - 250 mg/l SO<sub>4</sub><sup>2-</sup>)

VISCOLOR® ECO  
Chlorine dioxide  
Product no.: 931221 /  
931021  
Rev. 1210.3  
2022-09

Photometric determination of chlorine dioxide  
(Measuring range: 0,20 – 3,80 mg/l ClO<sub>2</sub>)

### 3 Sampling and microbiological analysis of industrial water in accordance with Section 3 (8) 42<sup>nd</sup> BImSchV (Federal Emission Control Act)

#### Sampling

Method	Title
DIN EN ISO 19458 (K 19) 2006-12	Water quality - Sampling for microbiological analysis ----- Recommendation of the Federal Environmental Agency for the sampling and detection of Legionella in evaporative cooling plants, cooling towers and wet separators dated 06.03.2020, Sections C and D

#### Microbiological analyses

Parameter	Method
Legionella	DIN EN ISO 11731 (K 23) 2019-03 ----- Recommendation of the Federal Environmental Agency for the sampling and detection of Legionella in evaporative cooling plants, cooling towers and wet separators dated 06.03.2020, Sections E and F taking into account Annexes 1 and 2
Colony count at 22°C and 36 °C	DIN EN ISO 6222 (K 5) 1999-07